

## CLAIMS

What is claimed is:

1. An isolated and purified nucleic acid comprising a sequence encoding a protein selected from the group consisting of SEQ ID NOs: 2,3 and 34.

5 2. The nucleic acid sequence of Claim 1, wherein said sequence is operably linked to a heterologous promoter.

3. The nucleic acid sequence of Claim 1, wherein said sequence is contained within a vector.

10 4. The nucleic acid sequence of Claim 3, wherein said vector is within a host cell.

5. An isolated and purified nucleic acid sequence that hybridizes under conditions of low stringency to a nucleic acid selected from the group consisting of SEQ ID NO:1 and 33.

15 6. The nucleic acid sequence of Claim 5, wherein said sequence encodes a protein that activates NF- $\kappa$ B.

7. A vector comprising the nucleic acid sequence of Claim 5.

8. A host cell comprising the vector of Claim 7.

9. The host cell of Claim 8, wherein said host cell is located in an organism selected from the group consisting of a plant and an animal.

10. A protein encoded by a nucleic acid selected from the group consisting of SEQ ID NOs:1 and 33 and variants thereof that are at least 80% identical to SEQ ID NOs: 1 and 33, wherein said protein has at least one activity of Nod2.

11. The protein of Claim 10, wherein said activity is activation of NF- $\kappa$ B.

5 12. The protein of Claim 10, wherein said activity is binding to RICK.

13. The protein of Claim 10, wherein said protein is at least 90% identical to SEQ ID NOs:1 and 33.

14. The protein of Claim 10, wherein said protein is at least 95% identical to SEQ ID NOs:1 and 33.

10 15. A method for producing variants of Nod2 comprising:

- a) providing a nucleic acid sequence selected from the group consisting of SEQ ID NOs:1 and 33;
- b) mutagenizing said nucleic acid sequence; and
- c) screening said variant for Nod2 activity.

15 16. A nucleic acid encoding Nod2, wherein said Nod2 competes for binding to RICK with a protein encoded by a nucleic acid sequence selected from the group consisting of SEQ ID NOs:1 and 33.

20 17. A composition comprising a nucleic acid that inhibits the binding of at least a portion of a nucleic acid selected from the group consisting of SEQ ID NOs:1 and 33 to their complementary sequences.

18. A polynucleotide sequence comprising at least fifteen nucleotides capable of hybridizing under stringent conditions to the isolated nucleotide sequence of Claim 5.

5 19. A method for detection of a polynucleotide encoding Nod2 protein in a biological sample suspected of containing said polynucleotide encoding Nod2, comprising the step of hybridizing the polynucleotide sequence of Claim 12 to nucleic acid of said biological sample to produce a hybridization complex.

10 20. The method of Claim 19, further comprising the step of detecting said hybridization complex, wherein the presence of said hybridization complex indicates the presence of a polynucleotide encoding Nod2 in said biological sample.

21. The method of Claim 20, wherein prior to said hybridization, said nucleic acid of said biological sample is amplified.

15 22. A method for screening compounds for the ability to alter Nod2 activity, comprising:

a) providing:

i) a first polypeptide sequence comprising at least a portion of Nod2;

ii) a second polypeptide sequence comprising at least a portion of a protein known to interact with Nod2; and

20 iii) one or more test compounds;

b) combining in any order, said first polypeptide sequence comprising at least a portion of Nod2, said second polypeptide sequence comprising at least a portion of a protein known to interact with Nod2, and said one or more test compounds under conditions such that said first polypeptide sequence, said second polypeptide sequence, and said test compound interact; and

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c) detecting the presence or absence of an interaction between said polypeptide sequence comprising at least a portion of Nod2 and said polypeptide sequence comprising at least a portion of a protein known to interact with Nod2.

5           23. The method of Claim 22, wherein said first polypeptide sequence is selected from the group consisting of SEQ ID NOs: 2-17 and 34.

24. The method of Claim 22, wherein said second polypeptide comprises RICK.

10           25. A purified polypeptide selected from the group consisting of SEQ ID NOs:2, 3, and 34.

26. A compound capable of inhibiting the binding of a Nod2 to a RICK polypeptide.

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